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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Complete If Known

Application Number	10/533,914
Filing Date	05/05/2005
First Named Inventor	Gary Haughton
Art Unit	1723
Examiner Name	David L. Serkin SOOHOO
Attorney Docket Number	P1112US04

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
/TS/		US- 6,830,369	12-14-2004	Haughton et al.	
		US- 6,070,348	06-06-2000	Blanchetti	
		US- 6,007,237	12-28-1999	Latto	
		US- 5,947,784	09-07-1999	Cullen	
		US- 5,813,760	09-29-1998	Strong	
		US- 5,738,018	04-14-1998	Burnett	
		US- 5,100,242	03-31-1992	Latto	
		US- 5,052,813	10-01-1991	Latto	
		US- 4,534,914	08-13-1985	Takahashi et al.	
		US- 4,440,616	04-03-1984	Houseman	
		US- 4,439,300	03-27-1984	Houseman	
		US- 4,319,971	03-16-1982	Good et al.	
		US- 4,302,318	11-24-1981	Mock	
		US- 4,189,362	02-19-1980	Dotson	
		US- 4,169,681	10-02-1979	Kato	
		US- 4,125,439	11-14-1978	Fleischmann et al.	
		US- 4,054,503	10-18-1977	Higgins	
		US- 3,912,237	10-14-1975	Ostberg et al.	
		US- 3,560,366	02-02-1971	Fisher	

FOREIGN PATENT DOCUMENTS

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		Country Code ² Number ⁴ Kind Code ⁵ (if known)				
/TS/		DE 75 04 145 U	06-19-1975	Muller		
		SU 858 898 A	08-30-1981	Umarnskii		
		SU 967 541 A	10-23-1982	Fomenko		
		FR 2 605 244 A	04-22-1988	Bionaz		
		WO 02/083280 A1	10-24-2002	Amosco Technology Ltd.		
/TS/		JP 11 184 420 A	07-09-1999	Mitsubishi Electric Corp.		

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Application Number	10/533,914
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Art Unit	1723
Examiner Name	David L. Gorkin SOOHOO
Attorney Docket Number	P1112US04

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/TS/		US- 3,214,148	10-26-1965	Thomas	
		US- 2,661,938	12-08-1953	Kuentzel et al.	
		US- 2,615,692	10-28-1952	Muller	
		US- 2,557,503	06-19-1951	Hogaboom, Jr.	
		US- 2,064,402	12-15-1936	Bannister et al.	
		US- 1,408,596	03-07-1922	Heinrich	
		US- 1,345,312	06-29-1920	Blake	
		US- 567,503	09-08-1896	Pelatan & Clerici	
/TS/		US- 52,890	02-27-1866	Ryerson	
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/TS/		GB 1 147 378 A	04-02-1969	Davis		
		JP 63104638	05-10-1988	Yoshida Masatoshi		
		DE 7416500	08-22-1974	Messerschmit-Bolkow-Blohm		
/TS/		FR 1 604 693 A	01-03-1972	Institut Merleux		

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NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
/TS/		TURNER, J.S. Intermittent Release of Smoke from Chimneys. Journal of Mechanical Engineering Science 1960, Vol. 2, No. 2, pages 97-100.	
		KENDIG, F. The Science of Smoke Rings and Doughnuts. Saturday Review, March 18, 1972, pages 40 and 44.	
		MAXWORTHY, T. Turbulent Vortex Rings. J. Fluid Mech. 1974, Vol. 64, Part 2, pages 227-239.	
		BAIRD et al. Velocity and Momentum of Vortex Rings in Relation to Formation Parameters. The Canadian Journal of Chemical Engineering, February 1977, Vol. 55, pages 19-26.	
		MAXWORTHY, T. Some Experimental Studies of Vortex Rings. J. Fluid Mech. 1977, Vol. 81, Part 3, pages 465-495.	
		SAFFMAN, P.G. The Number of Waves on Unstable Vortex Rings. J. Fluid Mech. 1978, Vol. 84, Part 4, pages 625-639.	
		ROHATGI, A. Mixing Effects and Hydrodynamics of Vortex Rings. Ph.D. Thesis at McMaster University, Hamilton, Ontario, June 1978.	
		PULLIN, D.I. Vortex Ring Formation at Tube and Orifice Openings. Phys. Fluids 22(3), March 1979, pages 401-403.	
		ROHATGI et al. Mixing Effects and Hydrodynamics of Vortex Rings. The Canadian Journal of Chemical Engineering, August 1979, Vol. 57, pages 416-424.	
✓/TS/		DIDDEN, N. On the Formation of Vortex Rings: Rolling-Up and Production of Circulation. Journal of Applied Mathematics and Physics (ZAMP) 1979, Vol. 30, pages 101-116.	

Examiner Signature	/Tony Soohoo/	Date Considered	07/07/2007
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	Art Unit		1723
	Examiner Name		David L. Sorkin SOOHOO
Sheet	4	of	5
Attorney Docket Number		P1112US04	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
/TS/		Ontario Ministry of the Environment, Water Resources Branch, Province of Ontario. Hamilton Harbour Study 1977, March 1981, pages 1-A11.	
		ROHATGI et al. Gas Absorption at a Liquid Surface Agitated by Vortex Rings. The Canadian Journal of Chemical Engineering, June 1981, Vol. 59, pages 303-309.	
		GLEZER, A. An Experimental Study of a Turbulent Vortex Ring. Ph.D. Thesis at California Institute of Technology, Pasadena, California, 1981.	
		SU 858 898B (UMANSKII, M.P.) 1981.08.30. (abstract), Soviet Patent Abstracts, Week 198225, London: Derwent Publications Ltd., AN 1982-51962E.	
		SU 967 541 A (FOMENKO, Y.) 1982.10.23. (abstract), Soviet Patent Abstracts, Week 198334, London: Derwent Publications Ltd., AN 1983-745919.	
		AHMAD et al. Mixing of Stratified Liquids. Chem. Eng. Res. Des. May 1985, Vol. 63, pages 157-167.	
		LATTO, B. "New Mixer for Slurries and Stratified Fluids" In: Proc. 12th Int. Conf. on Slurry Technology: March 31-April 3, 1987, New Orleans, Louisiana, U.S.A..	
		JP 63 104638 A (MASATOSHI). Patent Abstracts of Japan, Vol. 12, no 344 (C-528), 1988.05.10 (abstract).	
		LATTO et al. Mixing of Thermally Stratified Fluids by Injecting a Series of Vortex Rings - A Numerical Simulation. Trans IChemE, September 1990, Vol. 68, Part A, pages 457-463	
✓/TS/		LATTO et al. "Use of Vortex Rings for Mixing". In: Industrial Applications of Fluid Mechanics 1990, ASME, New York, FED, Vol. 100, pages 79-86.	

Examiner Signature	/Tony Soohoo/	Date Considered	07/07/2007
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/TS/		HUA, F. Numerical Simulation and Experimental Study of the Behaviour of Vortex Rings. Ph.D. Thesis at McMaster University, Hamilton, Ontario, 1994.	
/TS/		JP 11 184 420 A (MISTUBISHI ELECTRIC CORP.) 1999.07.09 (abstract). Japan Patent Abstracts, Section PQ, Week 199938, London: Derwent Publications Ltd., Class P85, AN 1999-44842	
/TS/		JP 11 184 420 A (MISTUBISHI ELECTRIC CORP.) Patent Abstracts of Japan, Vol. 1999, no. 12, 1999.07.09 (abstract).	

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